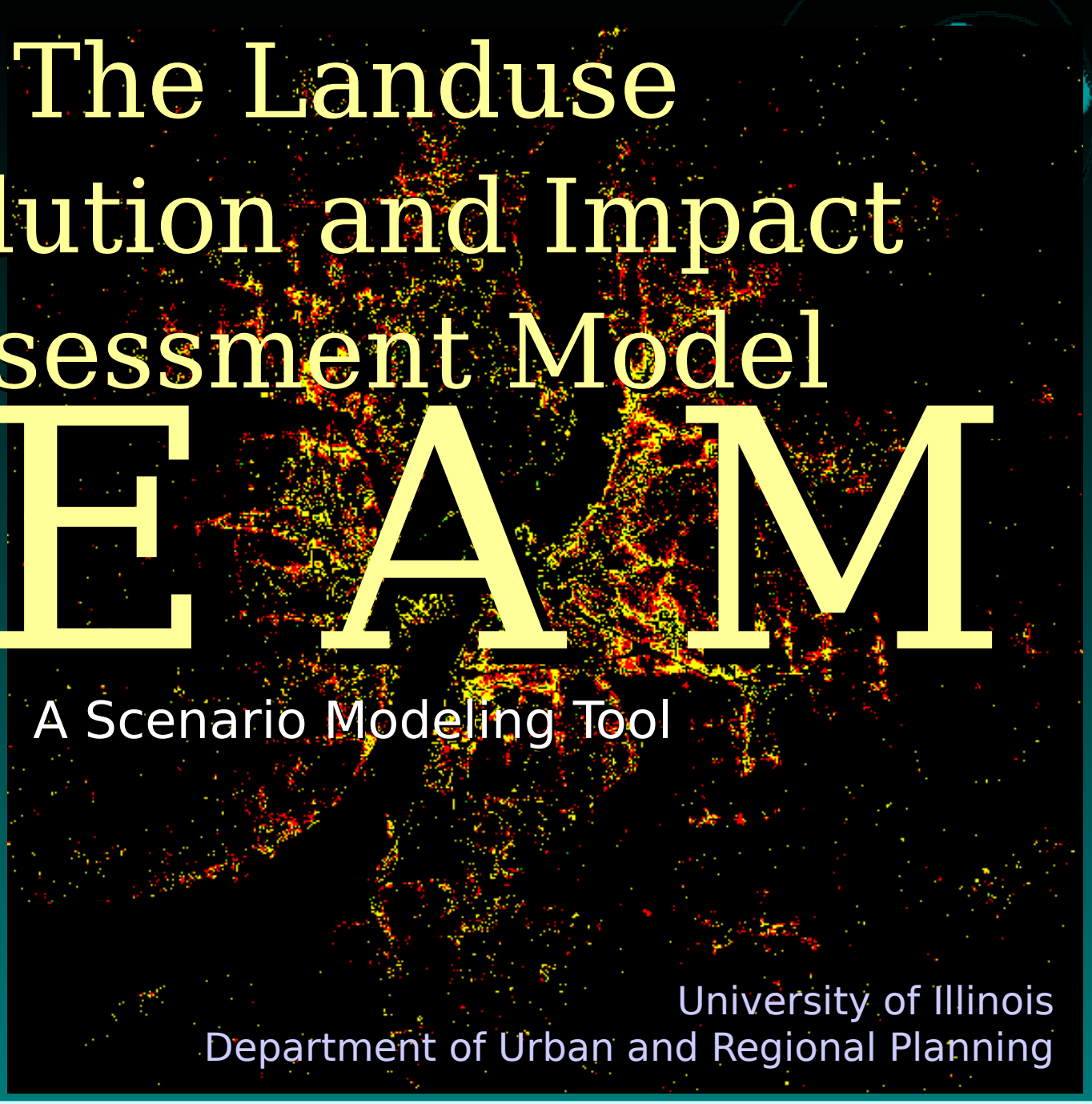
The Landuse Evolution and Impact Assessment Model

LEAM

A Scenario Modeling Tool

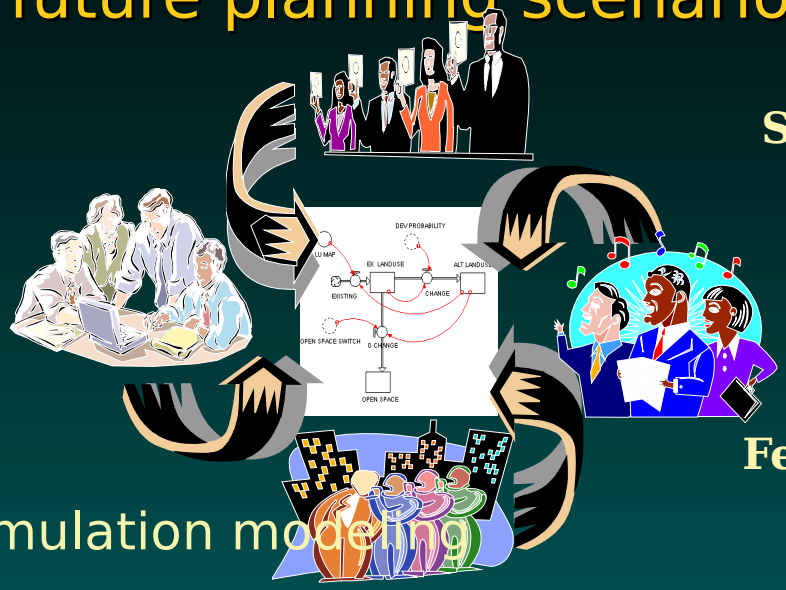


University of Illinois
Department of Urban and Regional Planning

leam

Spatial Simulation Modeling

How do we assess future planning scenarios?



LEAM

- a dynamic spatial simulation modeling environment
  - distributed modeling approach
  - scenario based planning
  - societal and environmental impact assessment
- sustainable indicator and risk assessment tool

PARTNERS

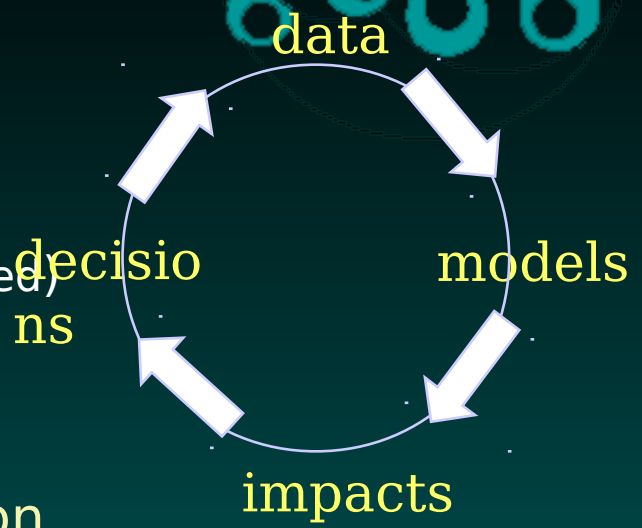
State of Illinois
IDNR
IDOT
IEPA
IDAG
ISHPO

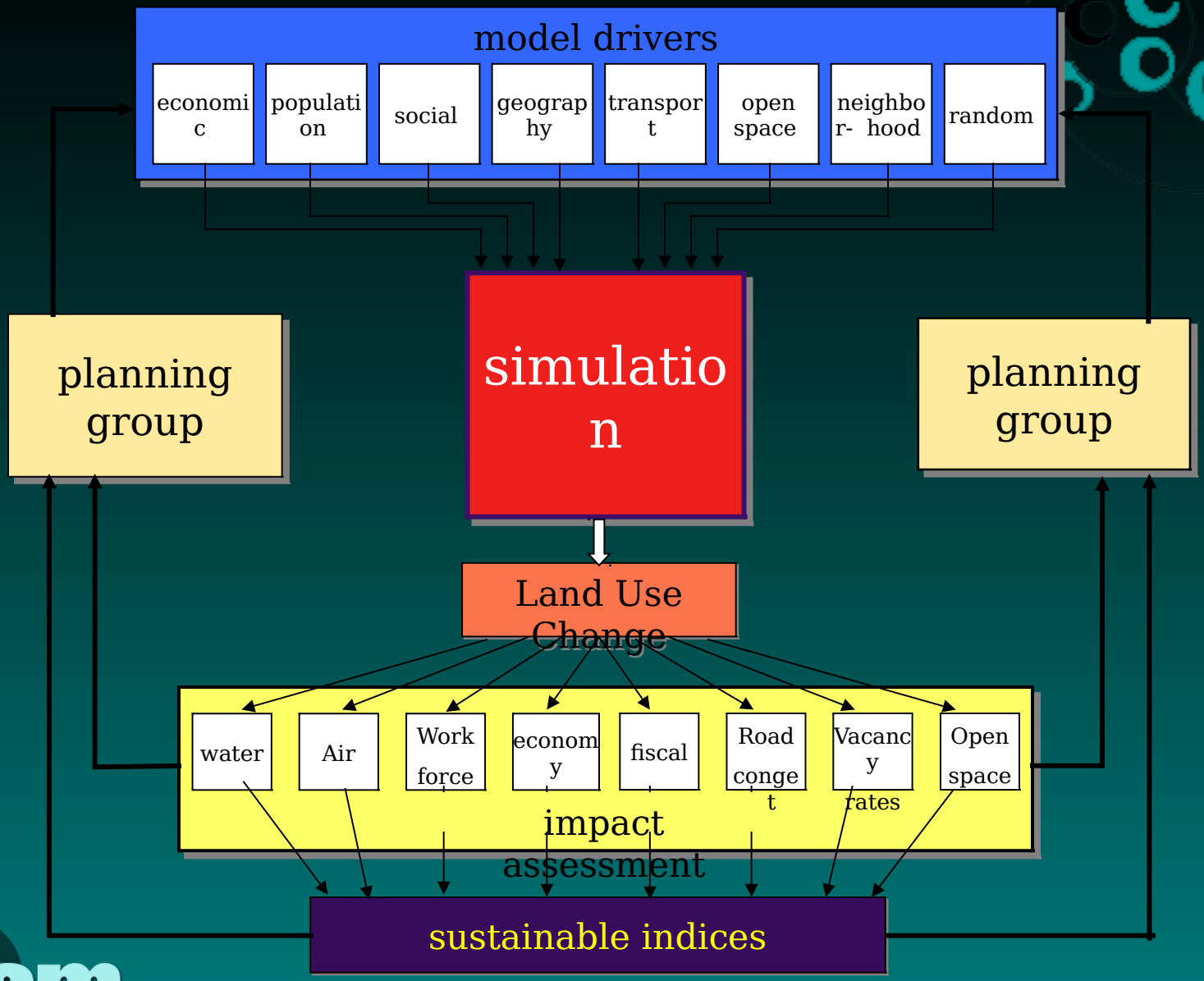
Federal Agencies
NSF
USGS
SERDP
DOD
NCSA
ERDC - CERL
USAF

University of Illinois urban planning
geography
architecture
landscape architecture
agriculture

LEAM Components

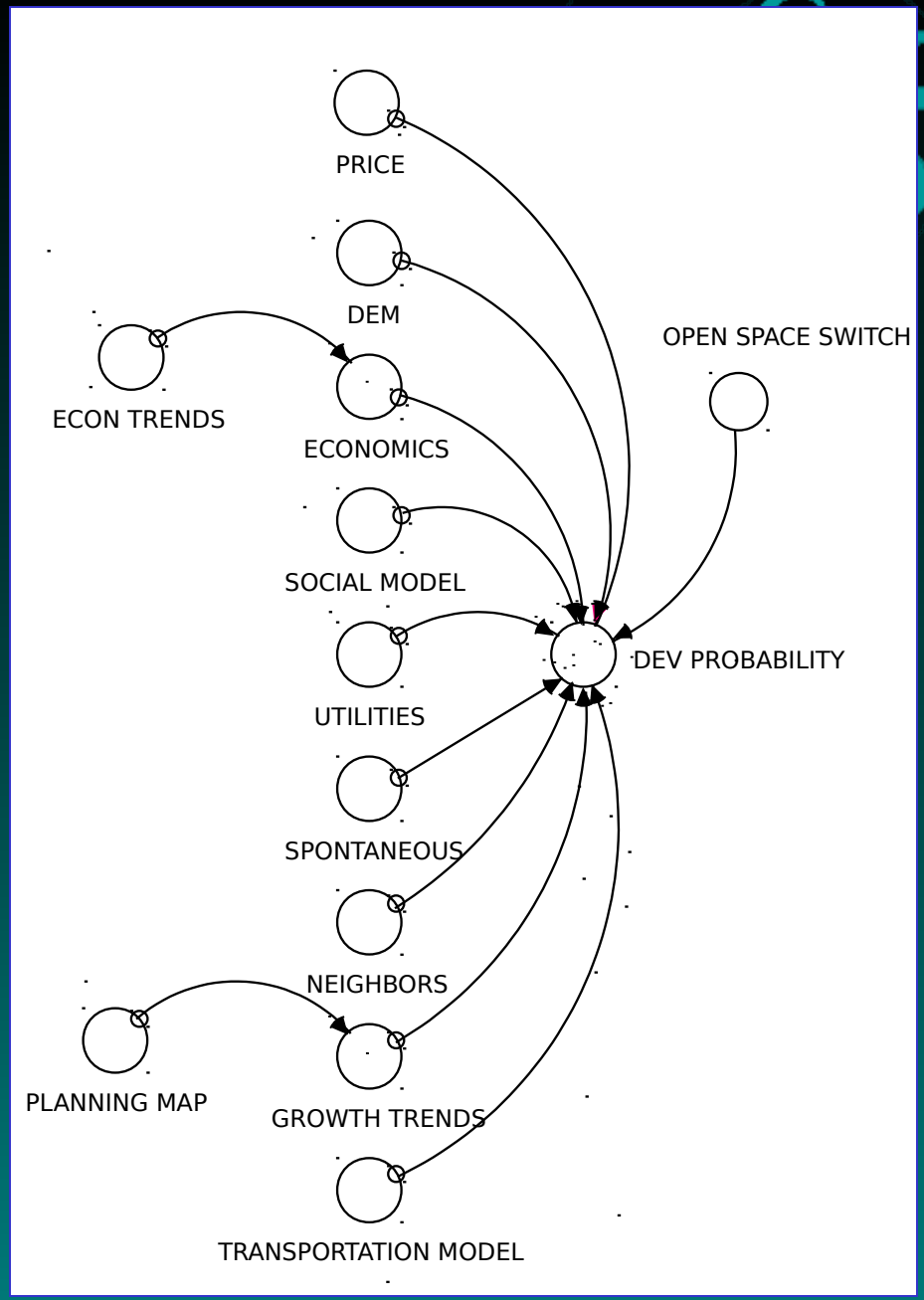
- spatial and dynamic
- regional specific
- publicly accessible
  - web based and easy to use - (democratized)
  - graphic
- be able to integrate submodels
  - capture feedback between systems
- open architecture for ease of modification
  - distributed computational environment
- it should include multiple scales
- multiple landuse change factors including:
  - physical, social and economic drivers
- be able to produce what-if landuse planning scenarios
- impact evaluation (so what?)
  - economic, environmental and societal impacts
- transportable
- interdisciplinary




model drivers
economic
population
social
geography
transport
open space
neighbor- hood
random
planning group
simulation
planning group
Land Use Change
water
Air
Work force
economy
fiscal
Road congest
Vacancy rates
Open space
impact assessment
sustainable indices

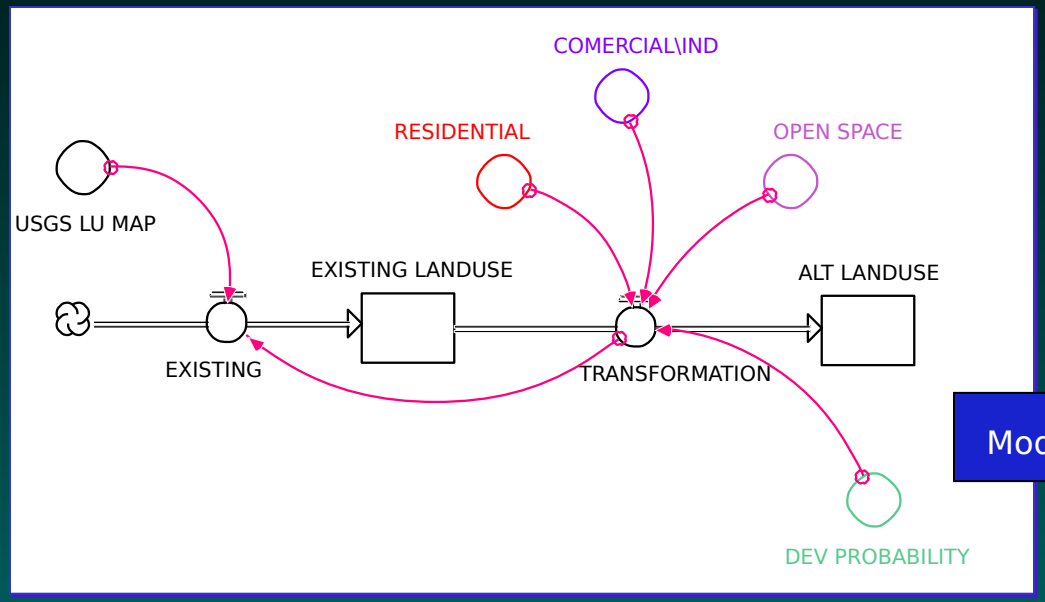
transformation probabilities

- open space
- DEM
- economics
- social models
- utilities
- spontaneity
- neighborhood
- growth trends
- transportation model



land use drivers

conceptual framework



what if ?

Model Drivers

SME

M

GIS Maps

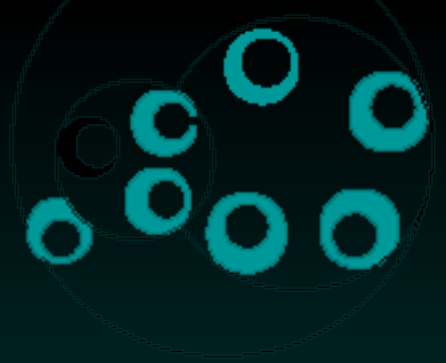
Map 1

Map 2

Map 3

Impact Assessment

simulation results

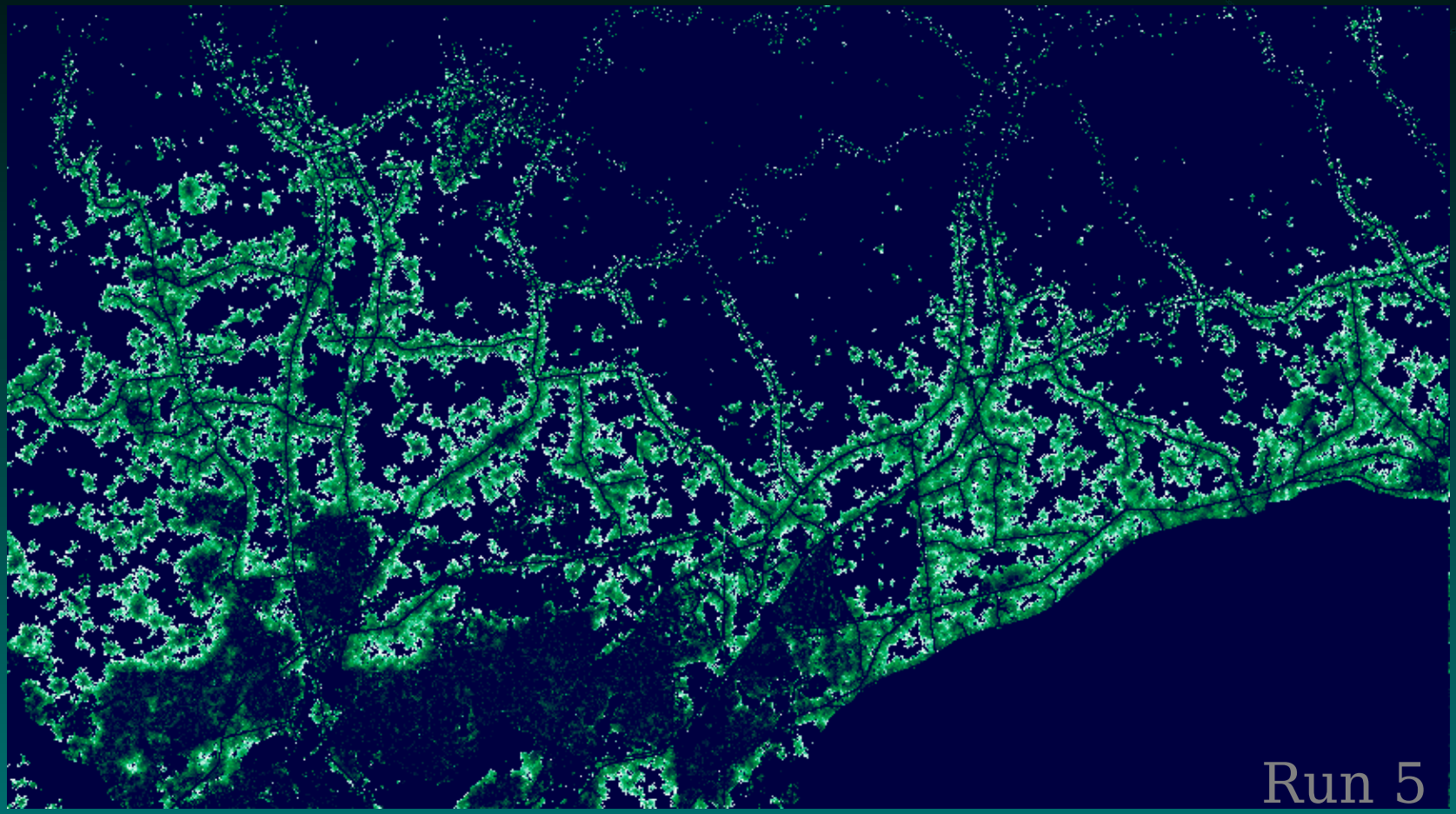


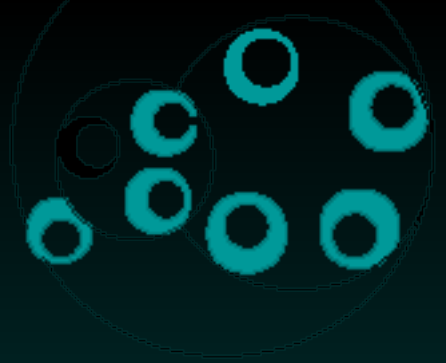
QuickTime™ and a
GIF decompressor
are needed to see this picture.

Run 5

leam

simulation results



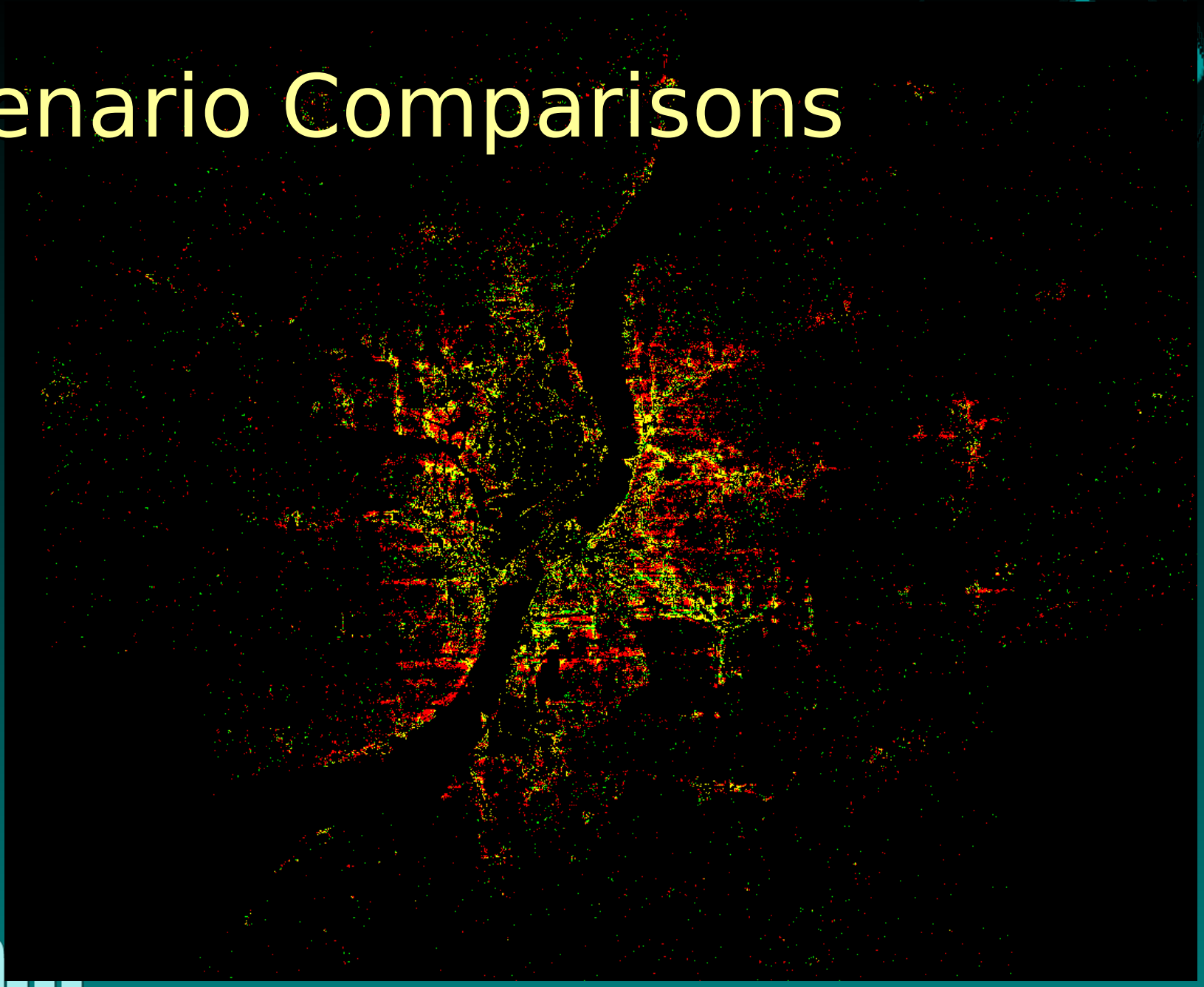


mLEAM

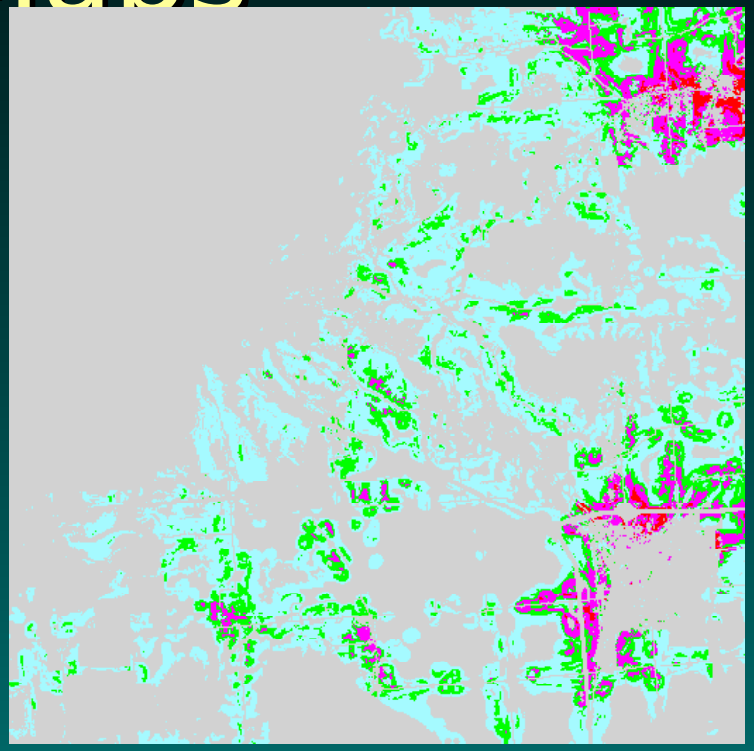
Columbus/Ft Benning GA

8m cells

Scenario Comparisons

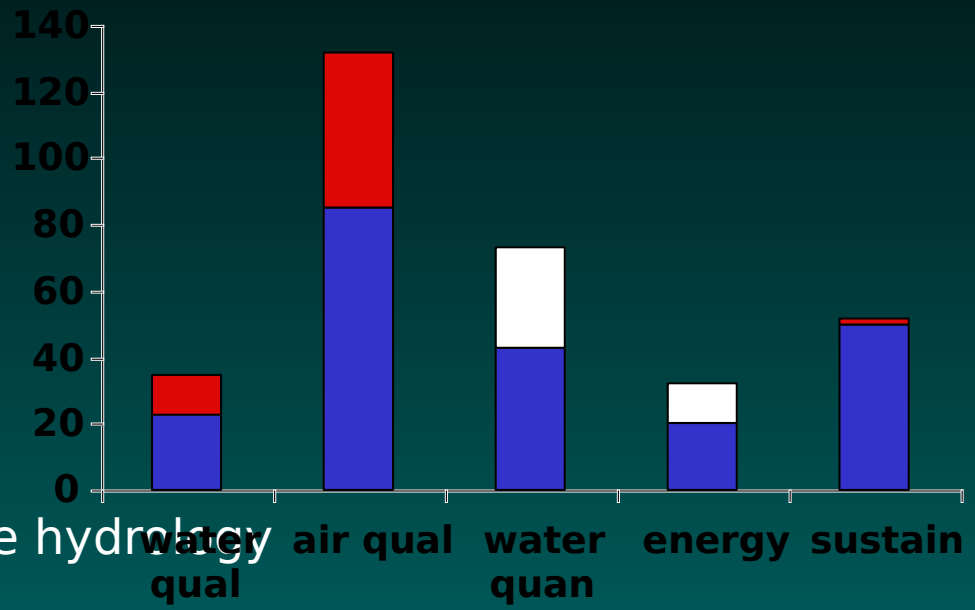


Probability Maps



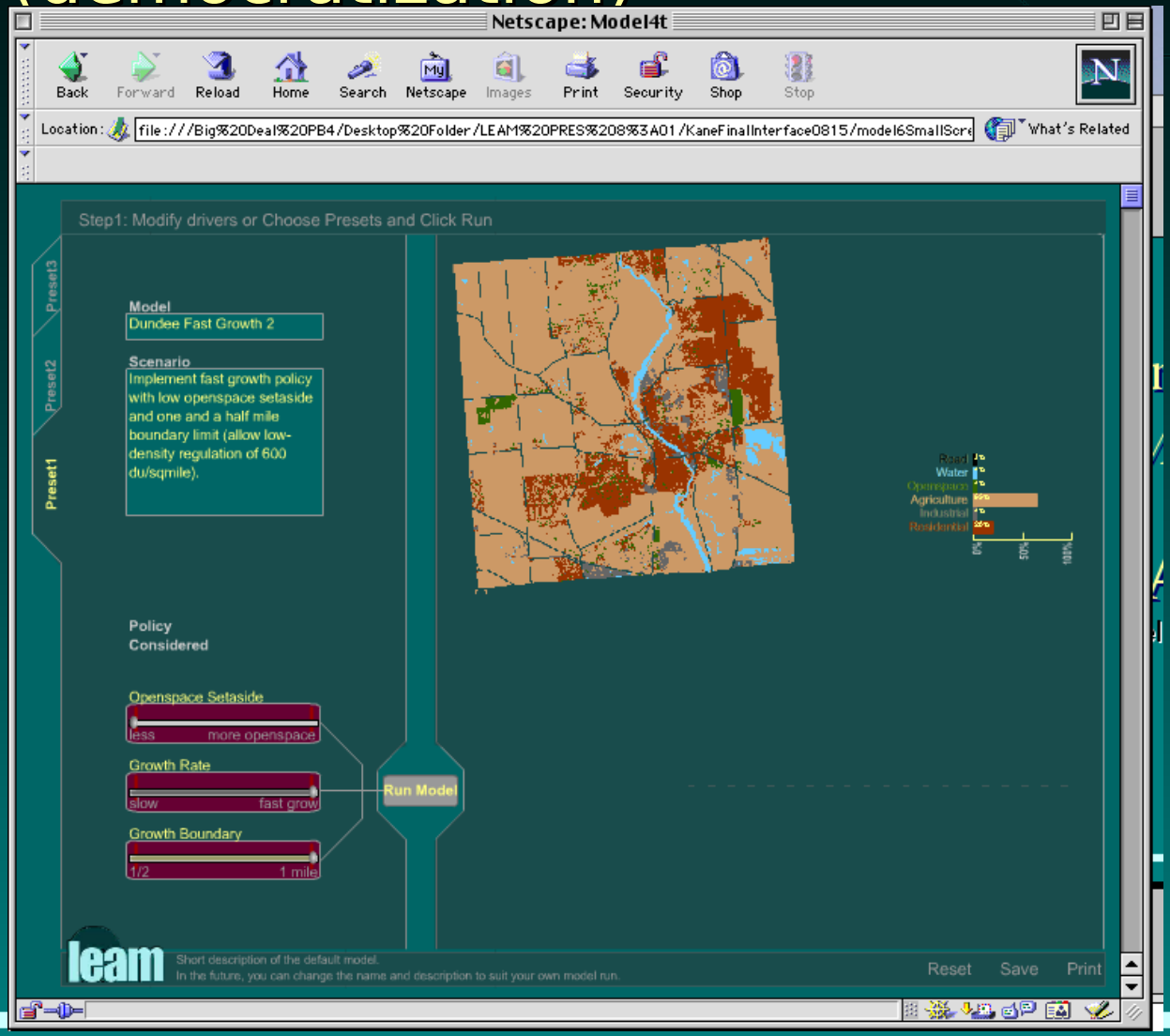
Impacts

- economic impacts
  - Housing affordability
  - Fiscal
  - Work force
  - Vacant land
- social impacts
  - quality of life
  - drive times
- biodiversity
- water quality
  - surface/subsurface hydrology
- energy
- air quality
- habitat loss/ fragmentation



so what?

user interface
(democratization)



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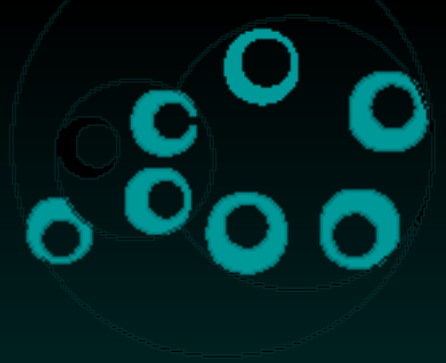

Process

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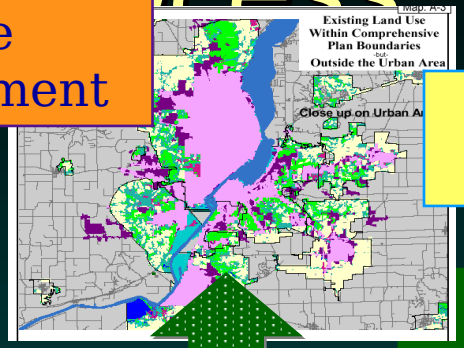
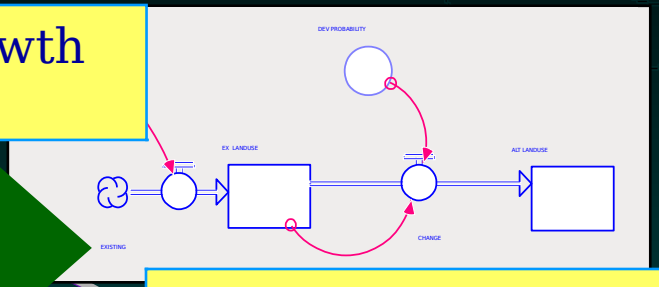
A Decision Support Process

issue development



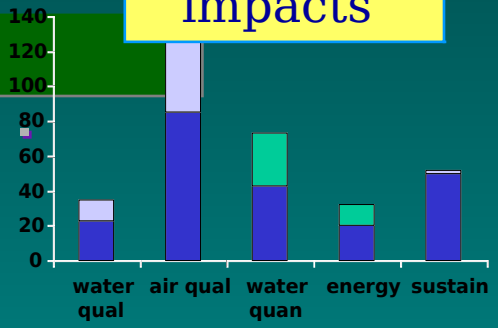
assess growth drivers



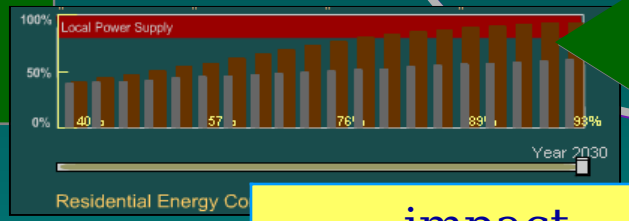
simulation modeling (LEAM)

change scenarios

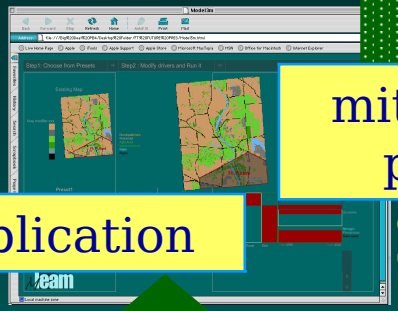
impacts



impact evaluation



application



mitigation plans

Stakeholder Involvement

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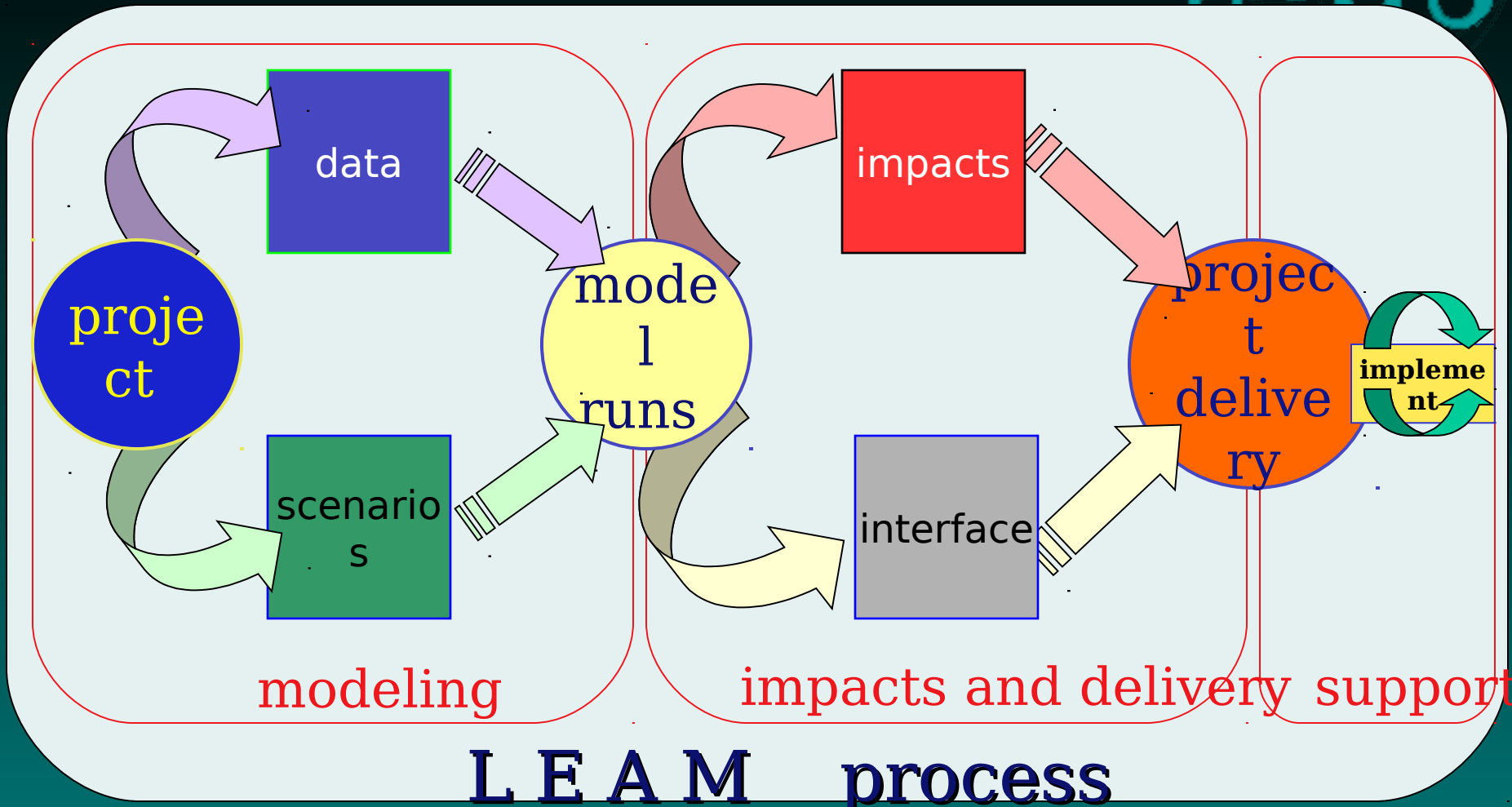
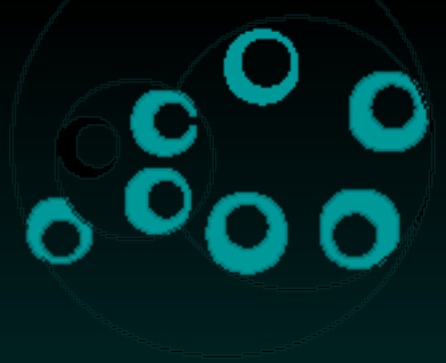


L E A M process



Application

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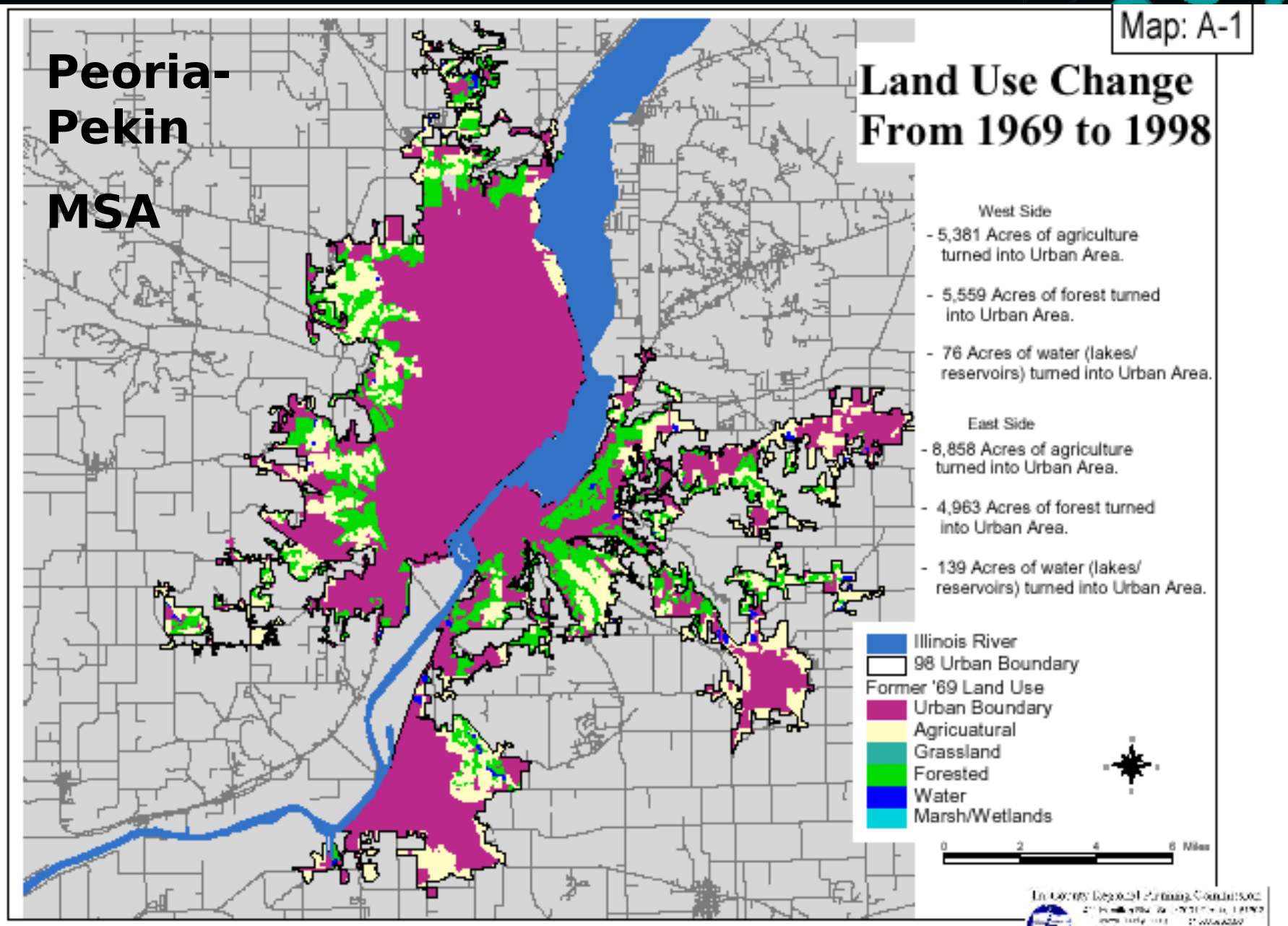
Will it Play in Peoria?

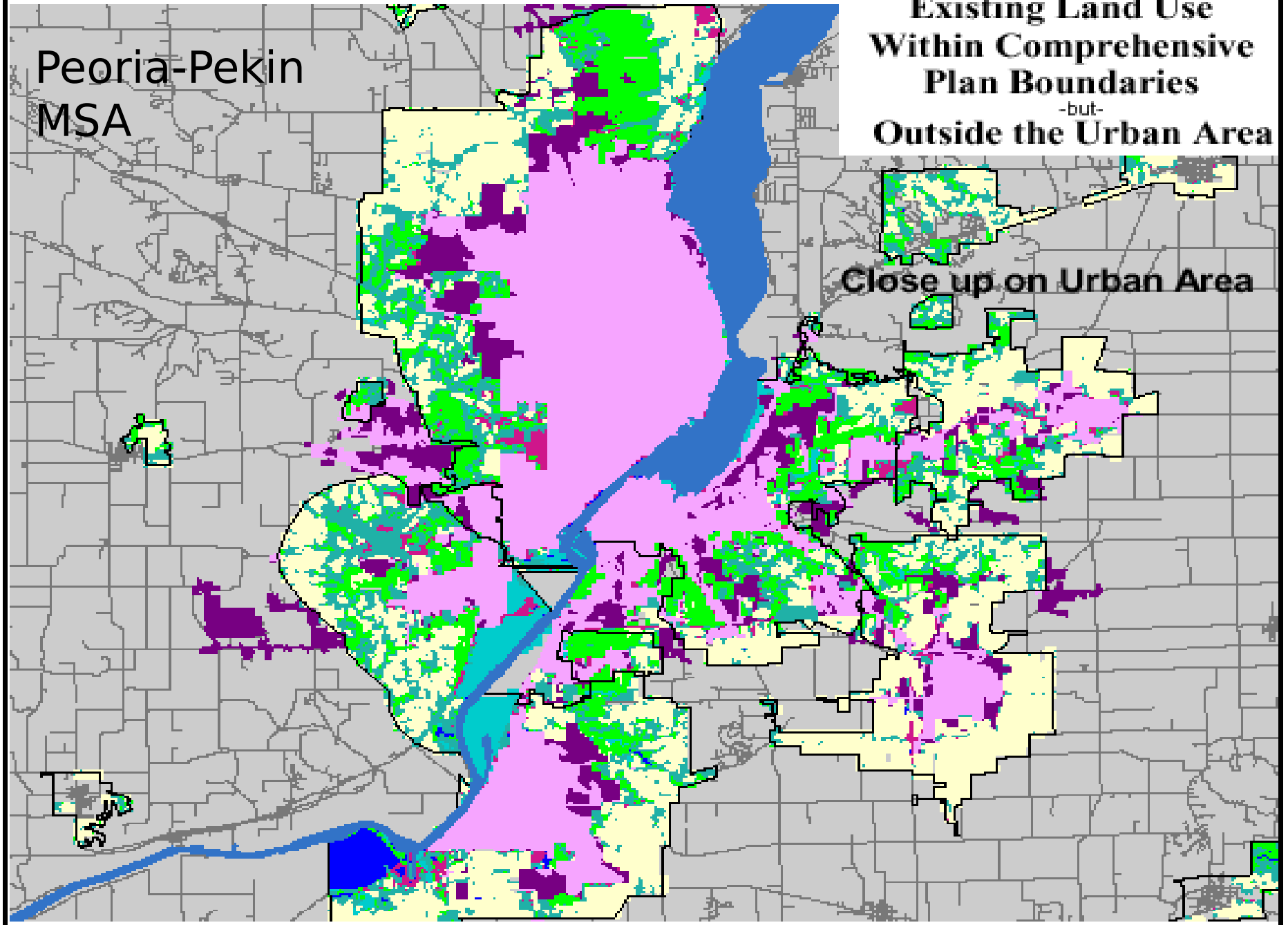
pLEAM

State Partners

- Governor Balanced Growth Cabinet
- University of Illinois
- Illinois Department of Natural Resources
- Illinois Department of Transportation
- Department of Commerce & Community Affairs
- Illinois Workforce Advantage
- Tri-County Regional Planning Commission

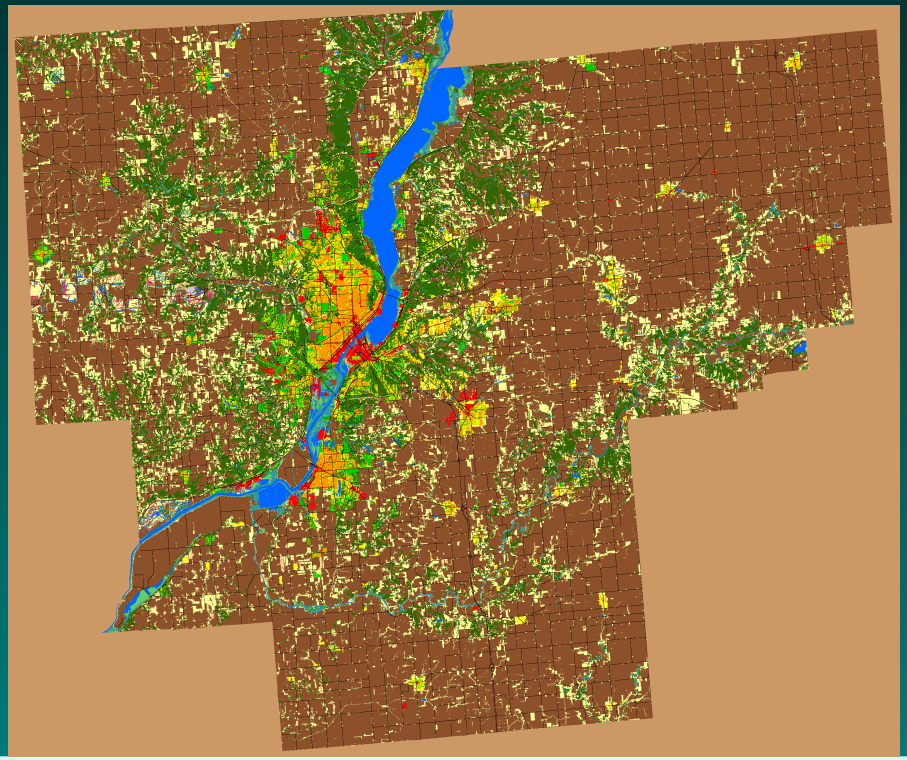

Peoria-
Pekin
MSA
Map: A-1
Land Use Change
From 1969 to 1998
West Side
- 5,381 Acres of agriculture turned into Urban Area.
- 5,559 Acres of forest turned into Urban Area.
- 76 Acres of water (lakes/ reservoirs) turned into Urban Area.
East Side
- 8,858 Acres of agriculture turned into Urban Area.
- 4,963 Acres of forest turned into Urban Area.
- 139 Acres of water (lakes/ reservoirs) turned into Urban Area.
Illinois River
98 Urban Boundary
Former '69 Land Use
Urban Boundary
Agricuatural
Grassland
Forested
Water
Marsh/Wetlands
0 2 4 6 Miles

Map: A-3


Peoria-Pekin
MSA
Existing Land Use
Within Comprehensive
Plan Boundaries
-but-
Outside the Urban Area
Close up on Urban Area

Where Do We Want To Go?

- Scenario Creation/Selection Process
- Introduce Scenarios to the pLEAM model!
- Analyze the Impacts of the Selected Scenarios



<u>Selected Scenarios Include:</u>

- Business As Usual
- Agricultural Preservation
- Bluff Preservation
- Incentivized Areas Plan
- Eastern By-Pass Addition
- High, and Low Economic Climates.

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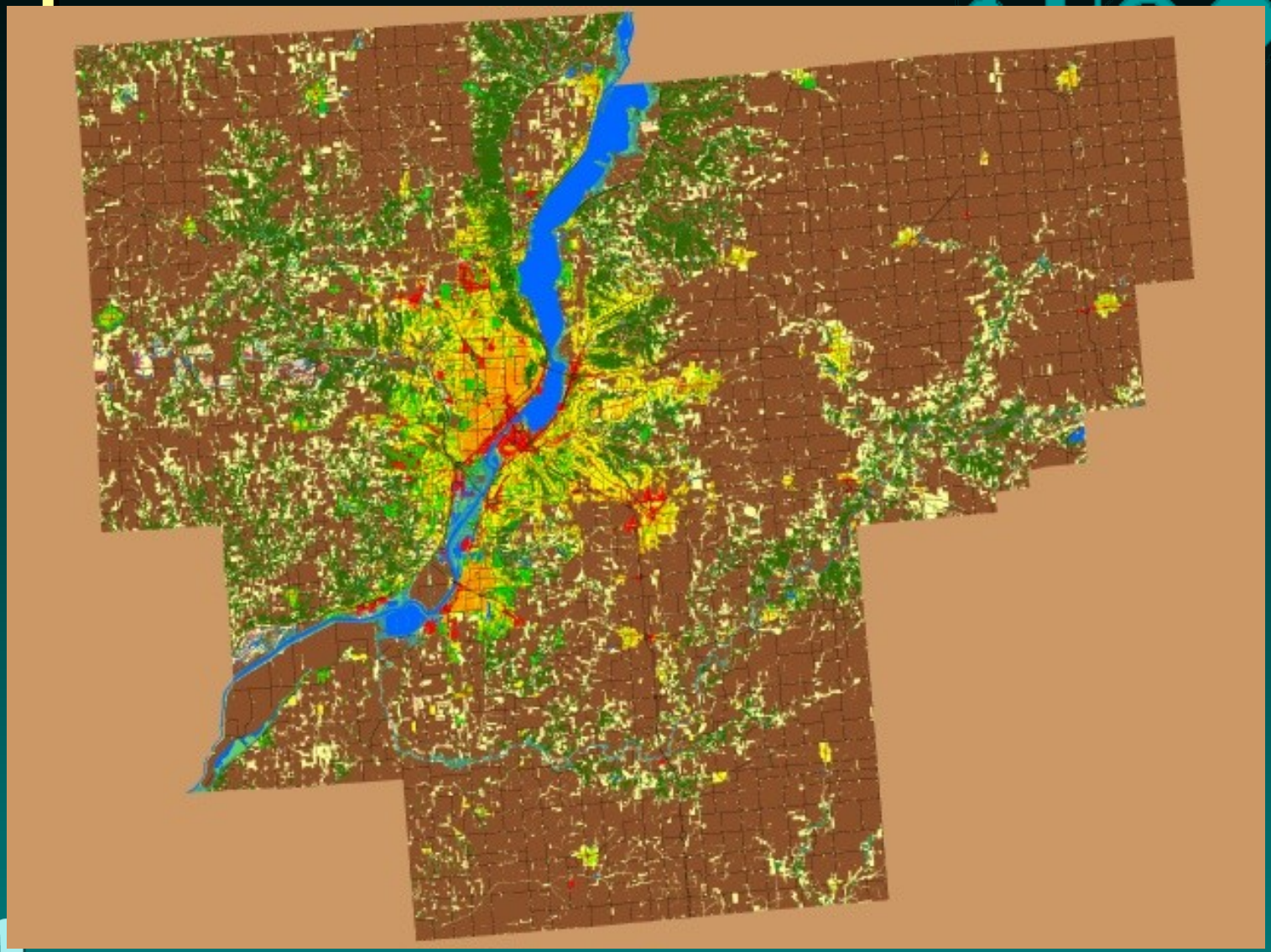
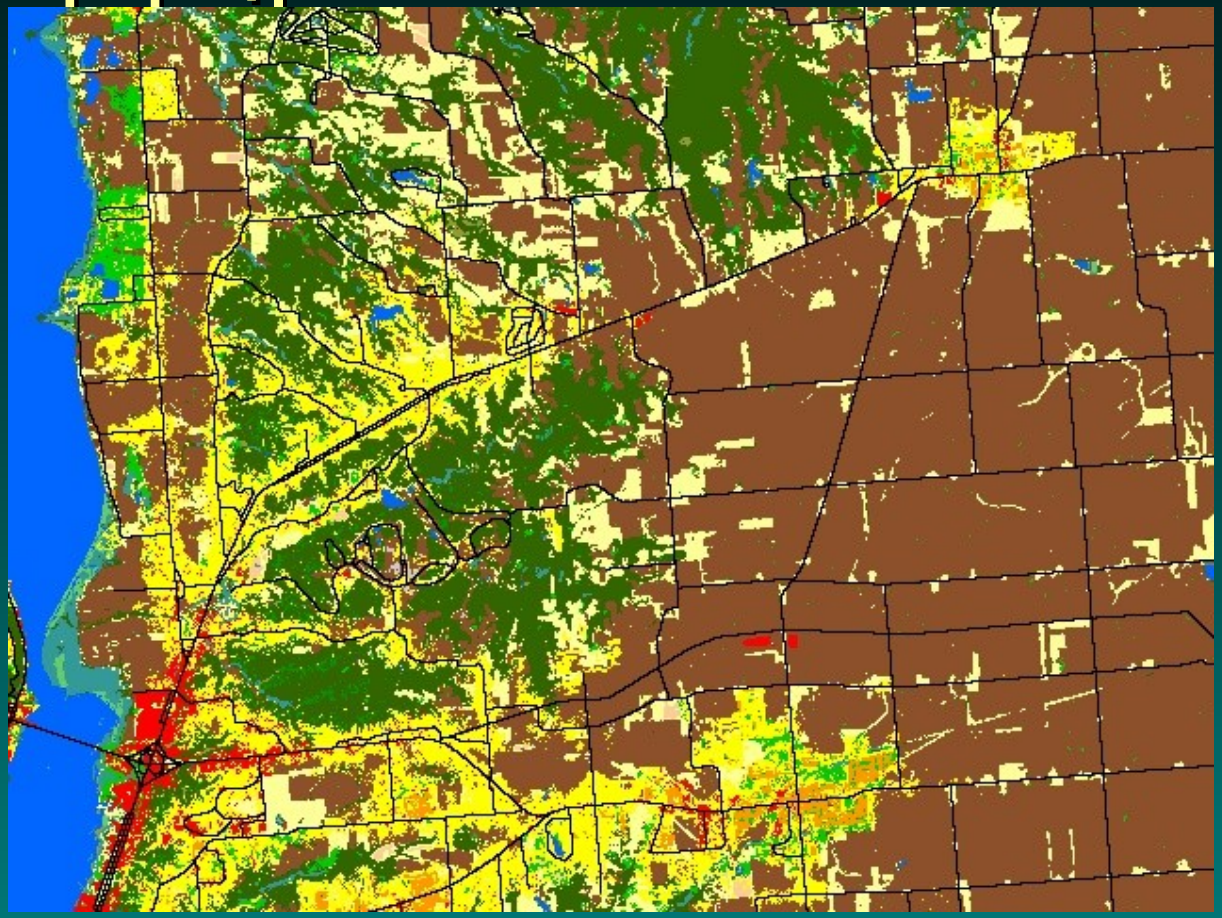
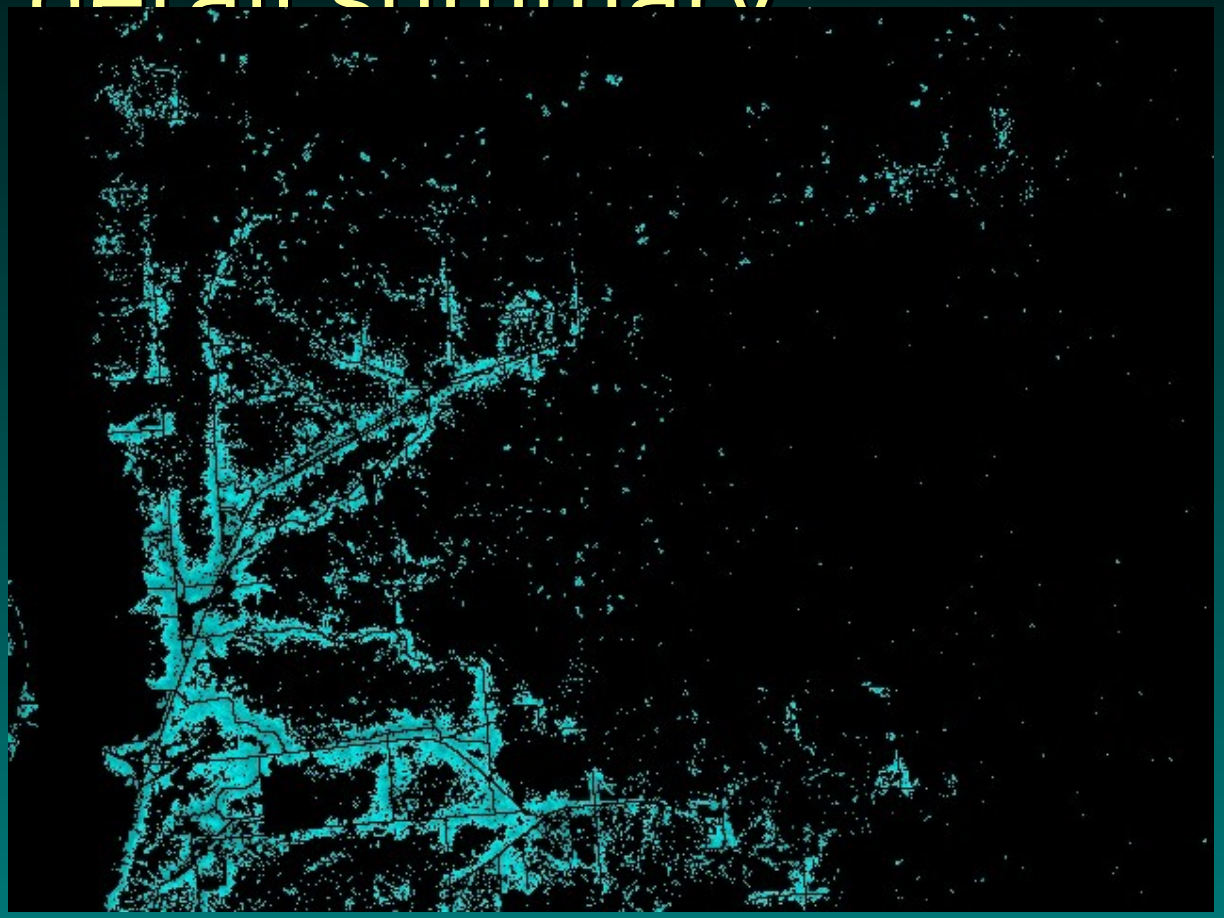


pLEAM



pLEAM

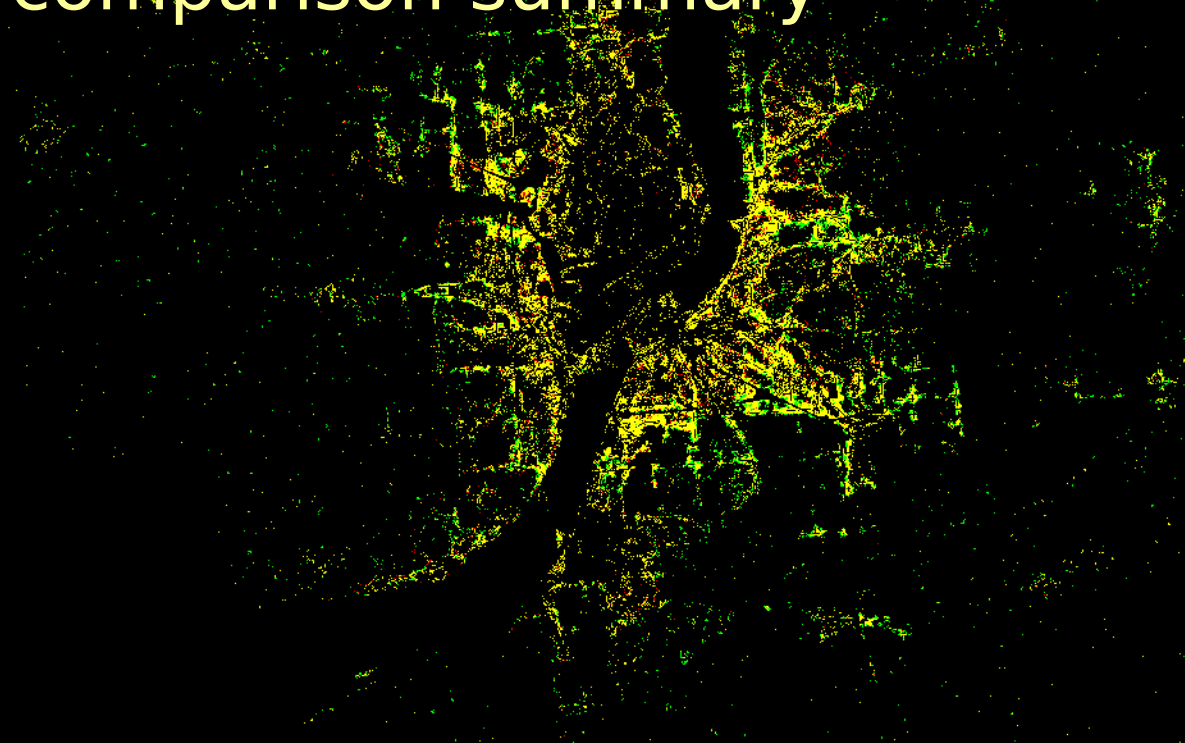
detail summary



Scenario:

Agriculture Preservation

comparison summary

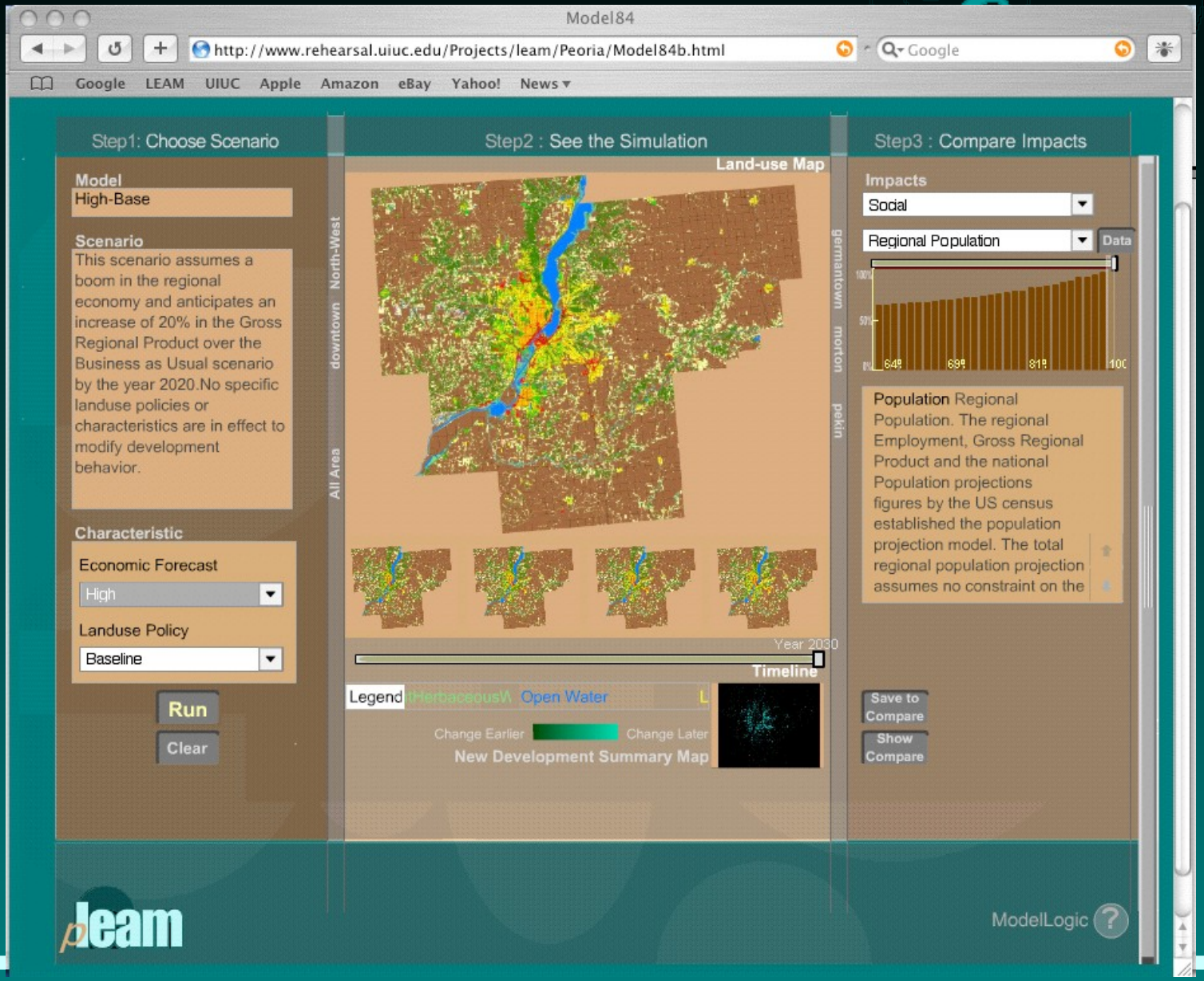


Red is new development- attributed to the ag pres. scenario

Yellow is development that occurred in both the “Base” and ag preservation scenarios

Green is development that only occurred in the Base

pLEAM user interface

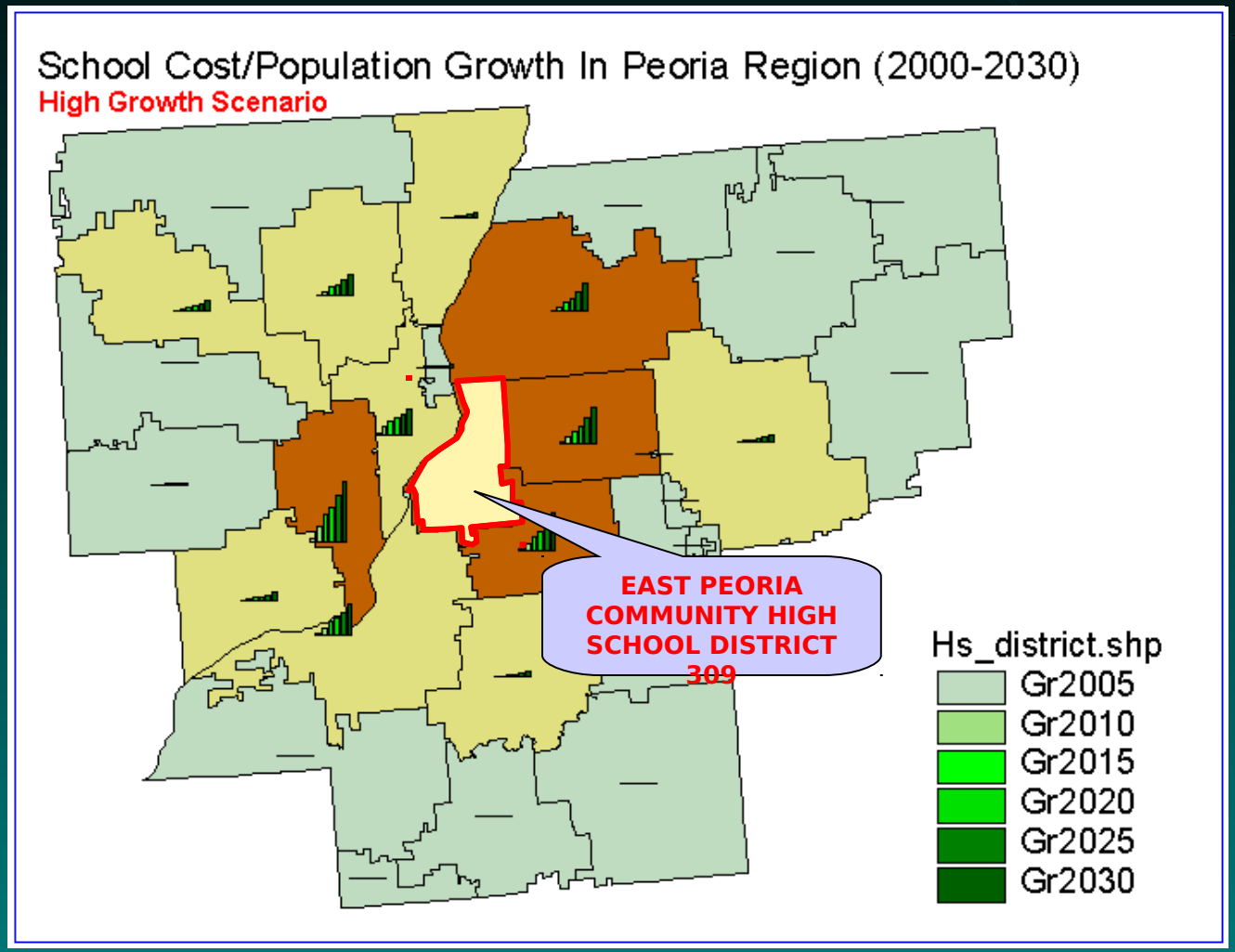


leam.

Regional School Cost Data

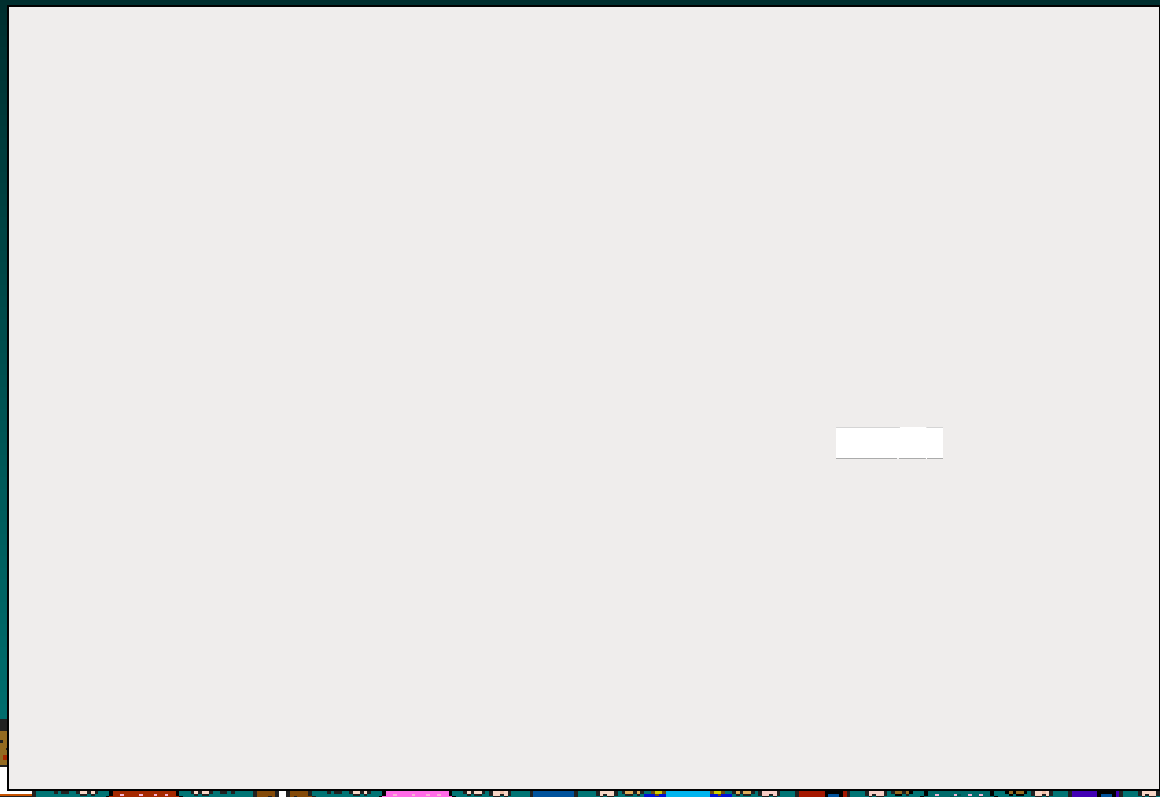
manufacturing loss sce

Spatial School Cost Data



District Costs Analysis

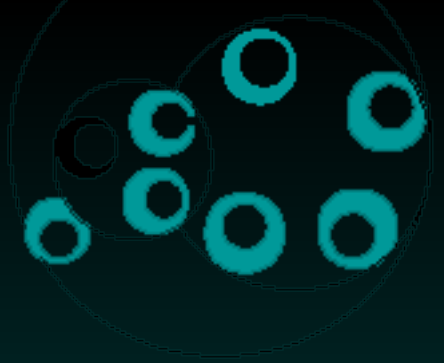
East Peoria School District



District Cost Analysis:

East Peoria School District

Contact Information



- www.rehearsal.uiuc.edu/leam/gleam.htm
- www.rehearsal.uiuc.edu/leam
- deal@uiuc.edu

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